

Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE 30 SEP 1999		2. REPORT TYPE		3. DATES COVERED 00-00-1999 to 00-00-1999	
4. TITLE AND SUBTITLE Optical Characteristics of Southern California Waters				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Oregon State University, College of Oceanic and Atmospheric Sciences, 104 Oceanography Admin Bldg, Corvallis, OR, 97331				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 2	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Optical Characteristics of Southern California Waters

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LONG-TERM GOALS

To determine the forcing mechanisms important in altering the optical properties in shallow water.

OBJECTIVES

The objective of this study is to evaluate the potential performance of optical detection systems by measuring the optical properties of the water column in conjunction with a test of optical detection systems.

APPROACH

During the spring of 1999 measurements of the inherent optical properties, including the absorption, scattering, beam attenuation, and backscattering coefficients, were collected during a Navy exercise to evaluate optical systems. Because the deployment criteria of the optical systems prevented simultaneous deployment of the instruments for measuring the inherent optical properties, we choose to use a small boat as the base of operations. We deployed the instruments as permitted in the region of interest and processed the data in real time to allow a description of the optical fields to be transmitted to the ship via radio.

WORK COMPLETED

We completed the experiment and data processing. All data was provided to any interested person.

RESULTS

An upwelling driven phytoplankton bloom($\text{chl} > 10 \text{ mg/m}^3$) provided the dominant optical signal in the upper portion of the water column. A bottom boundary layer existed and its thickness was modulated by internal waves (figure 1).

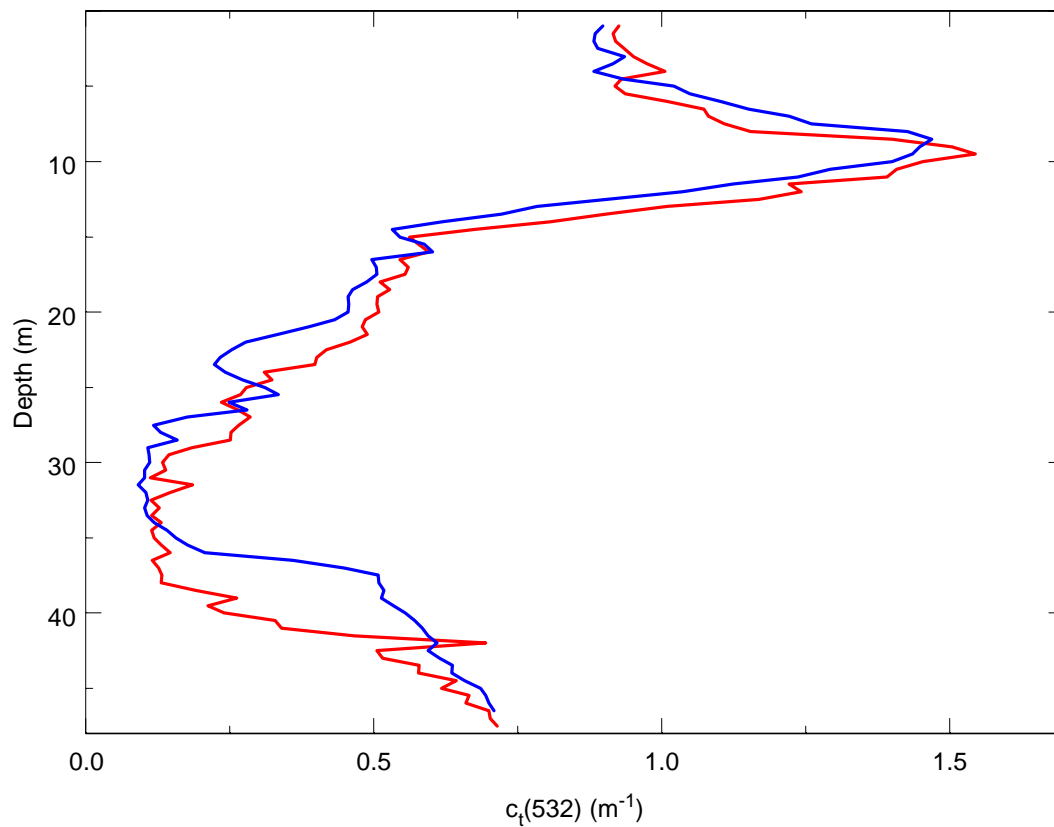


Figure 1. Sequential profiles of the beam attenuation coefficient. A phytoplankton bloom causes the large attenuation coefficients observed at 10 m. Internal waves modulated the thickness of the bottom boundary layer.

IMPACT/APPLICATIONS

This project demonstrated that it is feasible to collect a large suite of optical measurements from a small craft and process the data in real time.

TRANSITIONS

The data has been provided to the Navy personnel at the exercise and the personnel operating the optical systems being tested.

RELATED PROJECTS

None